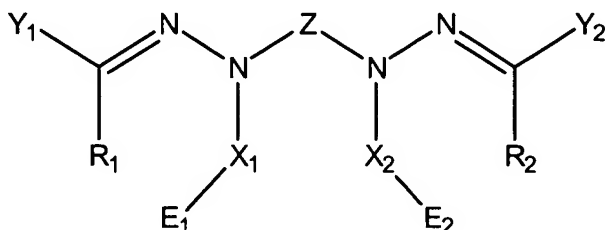


# CLAIMS

What is claimed is:

1. An organophotoreceptor comprising an electrically conductive substrate and a photoconductive element on the electrically conductive substrate, the photoconductive element comprising:

(a) a charge transport material having the formula



where Y<sub>1</sub> and Y<sub>2</sub> are, each independently, an arylamine group;

R<sub>1</sub> and R<sub>2</sub> comprise, each independently, H, an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group;

X<sub>1</sub> and X<sub>2</sub>, each independently, are bridging groups;

E<sub>1</sub> and E<sub>2</sub> are, each independently, an epoxy group; and

Z is a linking group comprising an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group; and

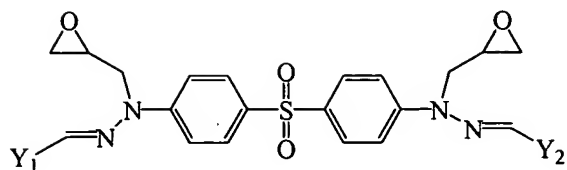
(b) a charge generating compound.

2. An organophotoreceptor according to claim 1 wherein Z comprises an aromatic group.

3. An organophotoreceptor according to claim 1 wherein Y<sub>1</sub> and Y<sub>2</sub> are, each independently, a carbazolyl group, an (N,N-disubstituted)arylamine group, or a julolidinyl group.

4. An organophotoreceptor according to claim 1 wherein E<sub>1</sub> and E<sub>2</sub> are, each independently, an oxiranyl ring.

5. An organophotoreceptor according to claim 1 wherein the charge transport material is selected from the group of compounds represented by the following formula:



where  $Y_1$  and  $Y_2$  are, each independently, an arylamine group.

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6. An organophotoreceptor according to claim 1 wherein  $X_1$  and  $X_2$ , each independently, have the formula  $-(CH_2)_m-$ , branched or linear, where  $m$  is an integer between 0 and 20, inclusive, and one or more of the methylene groups is optionally replaced by O, S, C=O, O=S=O, a heterocyclic group, an aromatic group, urethane, urea, an ester group, an  $NR_3$  group, a  $CHR_4$  group, or a  $CR_5R_6$  group where  $R_3$ ,  $R_4$ ,  $R_5$ , and  $R_6$  comprise, each independently, H, hydroxyl group, thiol group, an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group.

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7. An organophotoreceptor according to claim 1 wherein the photoconductive element further comprises a second charge transport material.

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8. An organophotoreceptor according to claim 7 wherein the second charge transport material comprises an electron transport compound.

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9. An organophotoreceptor according to claim 1 wherein the photoconductive element further comprises a binder.

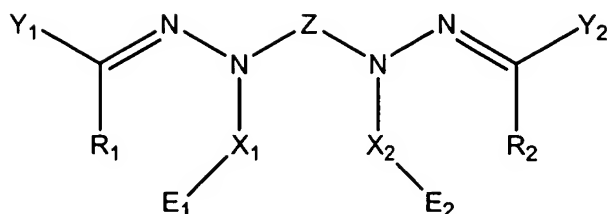
10. An electrophotographic imaging apparatus comprising:

(a) a light imaging component; and

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(b) an organophotoreceptor oriented to receive light from the light imaging component, the organophotoreceptor comprising an electrically conductive substrate and a photoconductive element on the electrically conductive substrate, the photoconductive element comprising:

(i) a charge transport material having the formula



where  $Y_1$  and  $Y_2$  are, each independently, an arylamine group;

$R_1$  and  $R_2$  comprise, each independently, H, an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group;

5  $X_1$  and  $X_2$ , each independently, are bridging groups;

$E_1$  and  $E_2$  are, each independently, an epoxy group; and

$Z$  is a linking group comprising an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group; and

(ii) a charge generating compound.

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11. An electrophotographic imaging apparatus according to claim 10 wherein  $Z$  comprises an aromatic group.

12. An electrophotographic imaging apparatus according to claim 10 wherein

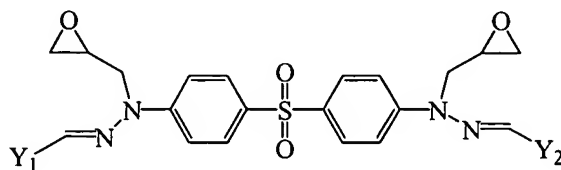
15  $Y_1$  and  $Y_2$  are, each independently, a carbazolyl group, an (N,N-disubstituted)arylamine group, or a julolidinyl group.

13. An electrophotographic imaging apparatus according to claim 10 wherein

$E_1$  and  $E_2$  are, each independently, an oxiranyl ring.

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14. An electrophotographic imaging apparatus according to claim 10 wherein the charge transport material is selected from the group of compounds represented by the following formula:



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where  $Y_1$  and  $Y_2$  are, each independently, an arylamine group.

15. An electrophotographic imaging apparatus according to claim 10 wherein  $X_1$  and  $X_2$ , each independently, have the formula  $-(CH_2)_m-$ , branched or linear, where  $m$  is an integer between 0 and 20, inclusive, and one or more of the methylene groups is optionally replaced by O, S, C=O, O=S=O, a heterocyclic group, an aromatic group, urethane, urea, an ester group, an  $NR_3$  group, a  $CHR_4$  group, or a  $CR_5R_6$  group where  $R_3$ ,  $R_4$ ,  $R_5$ , and  $R_6$  comprise, each independently, H, hydroxyl group, thiol group, an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group.

16. An electrophotographic imaging apparatus according to claim 10 wherein the photoconductive element further comprises a second charge transport material.

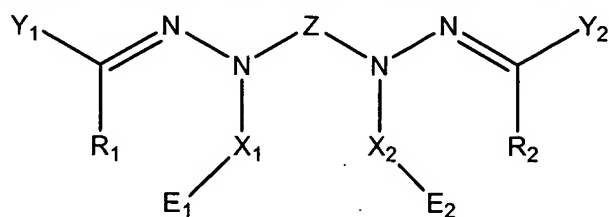
17. An electrophotographic imaging apparatus according to claim 16 wherein second charge transport material comprises an electron transport compound.

18. An electrophotographic imaging apparatus according to claim 10 further comprising a liquid toner dispenser.

19. An electrophotographic imaging process comprising;

(a) applying an electrical charge to a surface of an organophotoreceptor comprising an electrically conductive substrate and a photoconductive element on the electrically conductive substrate, the photoconductive element comprising

(i) a charge transport material having the formula



where  $Y_1$  and  $Y_2$  are, each independently, an arylamine group;

$R_1$  and  $R_2$  comprise, each independently, H, an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group;

$X_1$  and  $X_2$ , each independently, are bridging groups;

$E_1$  and  $E_2$  are, each independently, an epoxy group; and

$Z$  is a linking group comprising an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group; and

(ii) a charge generating compound.

5 (b) imagewise exposing the surface of the organophotoreceptor to radiation to dissipate charge in selected areas and thereby form a pattern of charged and uncharged areas on the surface;

(c) contacting the surface with a toner to create a toned image; and

(d) transferring the toned image to substrate.

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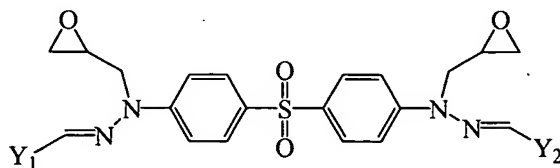
20. An electrophotographic imaging process according to claim 19 wherein  $Z$  comprises an aromatic group.

15 21. An electrophotographic imaging process according to claim 19 wherein  $Y_1$  and  $Y_2$  are, each independently, a carbazolyl group, an (N,N-disubstituted)arylamine group, or a julolidinyl group.

22. An electrophotographic imaging process according to claim 19 wherein  $E_1$  and  $E_2$  are, each independently, an oxiranyl ring.

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23. An electrophotographic imaging process according to claim 19 wherein the charge transport material is selected from the group of compounds represented by the following formula:



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where  $Y_1$  and  $Y_2$  are, each independently, an arylamine group.

24. An electrophotographic imaging process according to claim 19 wherein  $X_1$  and  $X_2$ , each independently, have the formula  $-(CH_2)_m-$ , branched or linear, where  $m$  is an

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wh

 $R_1$ 

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E. 1. 3

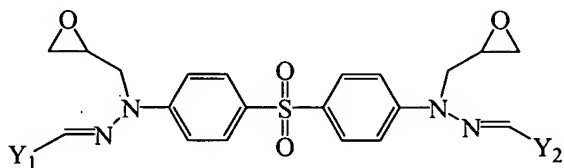
 $Z$  is

30. A charge transport material according to claim 29 wherein Z comprises an aromatic group.

31. A charge transport material according to claim 29 wherein  $Y_1$  and  $Y_2$  are, each independently, a carbazolyl group, an (N,N-disubstituted)arylamine group, or a julolidinyl group.

32. A charge transport material according to claim 29 wherein  $E_1$  and  $E_2$  are, each independently, an oxiranyl ring.

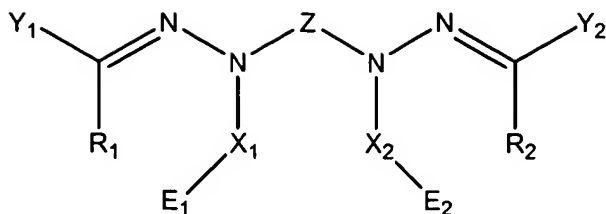
33. A charge transport material according to claim 29 wherein the charge transport material is selected from the group of compounds represented by the following formula:



where  $Y_1$  and  $Y_2$  are, each independently, an arylamine group.

34. A charge transport material according to claim 29 wherein  $X_1$  and  $X_2$ , each independently, have the formula  $-(CH_2)_m-$ , branched or linear, where  $m$  is an integer between 0 and 20, inclusive, and one or more of the methylene groups is optionally replaced by O, S, C=O, O=S=O, a heterocyclic group, an aromatic group, urethane, urea, an ester group, an  $NR_3$  group, a  $CHR_4$  group, or a  $CR_5R_6$  group where  $R_3$ ,  $R_4$ ,  $R_5$ , and  $R_6$  comprise, each independently, H, hydroxyl group, thiol group, an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group

35. A polymeric charge transport material prepared by the reaction of a functional group in a polymeric binder with at least an epoxy group of a compound having the formula



where Y<sub>1</sub> and Y<sub>2</sub> are, each independently, an arylamine group;

R<sub>1</sub> and R<sub>2</sub> comprise, each independently, H, an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group;

5  $X_1$  and  $X_2$ , each independently, are bridging groups;

E<sub>1</sub> and E<sub>2</sub> are, each independently, an epoxy group; and

Z is a linking group comprising an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group.

10            36.    A polymeric charge transport material according to claim 35 wherein the functional group of the binder is selected from the group consisting of hydroxyl group, carboxyl group, an amino group, and thiol group.

37. A polymeric charge transport material according to claim 35 wherein a  
15 crosslinking agent is bonded between the epoxy group and the functional group of the  
binder.

38. A polymeric charge transport material according to claim 35 wherein Z comprises an aromatic group.

39. A polymeric charge transport material according to claim 35 wherein Y<sub>1</sub> and Y<sub>2</sub> are, each independently, a carbazolyl group, an (N,N-disubstituted)arylamine group, or a julolidinyl group.

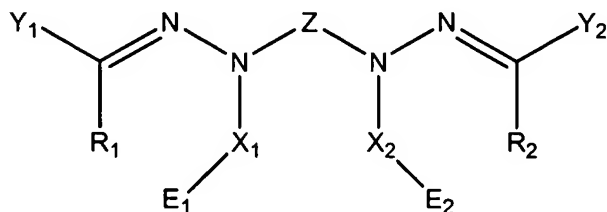
25 40. A polymeric charge transport material according to claim 35 wherein X<sub>1</sub> and X<sub>2</sub>, each independently, have the formula -(CH<sub>2</sub>)<sub>m</sub>-, branched or linear, where m is an integer between 0 and 20, inclusive, and one or more of the methylene groups is optionally replaced by O, S, C=O, O=S=O, a heterocyclic group, an aromatic group,



urethane, urea, an ester group, an  $\text{NR}_3$  group, a  $\text{CHR}_4$  group, or a  $\text{CR}_5\text{R}_6$  group where  $\text{R}_3$ ,  $\text{R}_4$ ,  $\text{R}_5$ , and  $\text{R}_6$  comprise, each independently, H, hydroxyl group, thiol group, an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group

41. An organophotoreceptor comprising an electrically conductive substrate and a photoconductive element on the electrically conductive substrate, the photoconductive element comprising:

(a) a polymeric charge transport material prepared by the reaction of a functional group in a polymeric binder with at least an epoxy group of a compound having the formula



where  $\text{Y}_1$  and  $\text{Y}_2$  are, each independently, an arylamine group;

$\text{R}_1$  and  $\text{R}_2$  comprise, each independently, H, an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group;

$\text{X}_1$  and  $\text{X}_2$ , each independently, are bridging groups;

$\text{E}_1$  and  $\text{E}_2$  are, each independently, an epoxy group; and

$\text{Z}$  is a linking group comprising an alkyl group, an alkenyl group, a heterocyclic group, or an aromatic group; and

(b) a charge generating compound.

42. An organophotoreceptor according to claim 41 wherein the photoconductive element further comprises a second charge transport material.

43. An organophotoreceptor according to claim 42 wherein the second charge transport material comprises an electron transport compound.

44. An organophotoreceptor according to claim 41 wherein the functional group of the binder is selected from the group consisting of hydroxyl group, carboxyl group, an amino group, and thiol group.

5           45. An organophotoreceptor according to claim 41 wherein Z comprises an aromatic group.

          46. An organophotoreceptor according to claim 41 wherein  $Y_1$  and  $Y_2$  are, each independently, a carbazolyl group, an (N,N-disubstituted)arylamine group, or a  
10 julolidinyl group.